Appendix

[0035]
(Example 1 and Comparative Example 1-3) A lead section was made by welding 0.2 mm of a gold line on to a gold foil with a diameter of 6 mm using a welding machine. Platinum layers, each having a thickness 0.1 μm, were formed on both sides of the gold foil by a spattering film-forming method. Isopropyl alcohol (Example 1), ethanol (Comparative Example 1), methanol (Comparative Example 2), and 1-propanol (Comparative Example 3) were each added to 1N perchloric acid aqueous solution so as to make sample solutions of 0.5 mol/L. The gold electrode having platinum layers is used as a working electrode. A platinum line is used as a counter electrode. A standard hydrogen electrode is used as a reference electrode. Each of the electrodes was immersed in each of the sample solutions, then electrochemical measurements were conducted at a ambient temperature. The results are shown in Figure.3. From the current-potential curve (cyclic voltamogram) of Figure.3, isopropyl alcohol (Example 1) shows larger absolute value of a current than methanol (Comparative Example 2), where methanol had been considered to be the most active alcohol, and shows negative potential when a current begins to flow, and thus it is superior to methanol as a fuel. Additionally, as shown in Fig.3, it is clear that ethanol (Comparative Example 1) and 1-propanol (Comparative Example 3) does not show better properties than methanol with regard to absolute value of the current and potential when a current begins to flow.

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(Example 2 and Comparative Example 4-6) The electrode used in Example 1 and Comparative Example 1-3 was replaced with an electrode that has platinum-ruthenium alloy (5:5 ratio of the two metals) provided on a gold foil by a spattering method. The same measurements as Example 1 and Comparative Example 1-3 were conducted with other conditions remaining the same. The results are shown in Figure.4. The rank of electrode oxidization of each alcohol was the same as the electrode with platinum layers (refer to Fig.3). However, especially when isopropyl alcohol (Example 2) and methanol (Comparative Example 5) are used, the platinum-ruthenium alloy shows larger absolute value of a current and negative potential when a current begins to flow, which clearly shows that the platinum-ruthenium alloy acts favor of electrode oxidation of alcohol.